

ABSTRACT

The present invention relates to the secure delivery of an extra-systolic stimulation (ESS) therapy to treat cardiac dysfunction that employs atrial and/or ventricular extra-systoles via pacing-like stimulation of the heart. These extra-systoles must be timed correctly to achieve beneficial effects on myocardial mechanics (benefit) while maintaining an extremely low level of risk of arrhythmia induction and excellent ICD-like arrhythmia sensing and detection (security). Further experience with ESS has led to improved implementation methods that depend on better blanking, ESS stimulation timing (of an "extra-systolic interval" or ESI), and ESS therapy delivery options and guidance. These methods may be employed individually or in combinations in an external or implantable ESS therapy delivery device.